

Additions of counts of predators on krill from vertical aerial images captured from the APH-22 hexacopter

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The Antarctic Ecosystem Research Division conducts long-term monitoring of penguins and pinnipeds and annual census data is a critical data stream. Counting high-density aggregations of breeding animals lends itself to aerial photography and we report on progress to validate aerial methods in our study colonies. Each year since 2012/13, we have paired nest and/or chick ground counts with aerial surveys. In general, counts of nests from ground observers and aerial images are indistinguishable. Counts of chicks alive at the end of the breeding season tend to be under-counted in aerial images. This may arise from rapid changes in juvenile plumage that alter detectability of chicks and/or mobility of chicks that alter their availability for imaging. Despite these challenges, photo-derived chick counts are within 10% of ground counts. Accuracy of aerial censuses may benefit from adoption of waypoint surveys to ensure complete study area coverage, gimbals that minimize camera movement and enhance ground resolution, and leveraging experience of our core flight team to best match census requirements with flight prerequisites (i.e., weather and light conditions). Looking ahead, the APH-22 provides a reliable platform that we plan to deploy for over-water missions to adjacent breeding aggregations. We are also looking to develop UAS with improved endurance for ship-to-shore missions throughout our research area in the South Shetland Islands. Finally understanding wildlife response to UAS is critical for the long-term sustainability of UAS in wildlife research. We will assess penguin and pinniped response to overhead hovering and horizontal flight in 2016/17.